

ABSTRACT OF THE DISCLOSURE

A compressor or pump employs principles of unsteady delayed stall to enhance the head increase produced by the compressor or pump. Plural airfoil-shaped lifting elements are spaced from each other in a cascade and the fluid is directed into the cascade by a device that varies a parameter of the flow relative to each lifting element in repeating cycles to cause the flow relative to each lifting element to begin to separate from the lifting element and then reattach thereto during each cycle. For example, when the invention is applied to an axial flow compressor, the cascade comprises an axial flow impeller with plural impeller blades arranged around a hub capable of rotating on an axis. The device for varying the flow parameter can be a stator with a plurality of stator blades upstream of said impeller, or a second, counter-rotating axial flow impeller. In either case, the parameter is a flow angle at which the flow is directed to the downstream impeller. The invention is applicable to any method, and any apparatus that incorporates structure, in which flow is directed to a cascade of lifting elements in a manner whereby the flow relative to each lifting element periodically begins to separate from the lifting element and then reattaches thereto.